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November 9, 2015

Superior National Forest
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Subject: FWS No. 03E19000-2015-F-0233
Special Use Projects; Kawishiwi, Laurentian, Gunflint, and Tofte Ranger Districts
Formal consultation on northern long-eared bat

Dear Ms. Halter:

The enclosed document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion and is based on our review of the Superior National Forest's (Forest) 2015 Special Use Projects: Kawishiwi, Laurentian, Gunflint, and Tofte Ranger Districts Biological Assessment and potential adverse effects to northern long-eared bat (*Myotis septentrionalis*). We also concur with your determination of "may affect, not likely to adversely affect" gray wolf (*Canis lupus*) and Canada lynx (*Lynx canadensis*) as described in this letter. The Biological Assessment (BA or Project), dated August 3, 2015, and cover letter, dated August 11, requesting formal consultation on the Project, were received in our office on August 17, 2015.

This concurrence letter and enclosed biological opinion are based on the best available scientific and commercial data and other scientific sources. The Service also requested clarification on some Project description information in the BA and the Forest responded via electronic mail. A complete administrative record is on file at the Twin Cities Ecological Services Field Office.

The following project description summarizes the BA's detailed information (pp. 5-6). There are 22 Special Use road permit projects proposed within the four Ranger Districts. The permits authorize construction or re-construction of roads/roadbeds and consist of three types of road use: (1) temporary access to State or County lands; (2) long-term access to two Minnesota Department of Natural Resources (MN DNR; correction from "USGS" in BA) stream monitoring sites; and (3) one permanent access to private property.

- Temporary road permits (19) will provide access to timber harvest areas ranging in size from 12 acres (ac) to 176 ac, with a total of approximately 1,746 ac. The access roads will be 20-feet (ft) wide and designed for all-season use (9), summer use (2), or winter use (8), totaling 16.5 miles (40 ac). Of that, 12 miles (mi) will be on pre-existing road or trail corridors and permits usually average 5 years, after which the roads will be obliterated.
- Long-term access will be issued for 15 years and includes building two new 16-ft wide roads for year-round use, totaling 0.28 mi (0.14 ac).
- The new 20-ft wide permanent road will provide year-round access to private property and totals 0.06 mi (0.54 ac).

Gray Wolf: The BA indicated that the wolf population was estimated to be 2,423 \pm 500 during winter 2013-2014, which is close to the long-term average. The project area encompasses Wolf Zones 1, 2, and 4, of which Zones 1 and 2 are designated critical habitat with specific population goals of one wolf per 10-15 mi² and one wolf per 10 mi², respectively. The winter 2014-2015 density estimates for these Zones were approximately one wolf/15 mi² and one wolf/13 mi², respectively, and therefore close to existing goals. In addition to population goals, the Wolf Management Zone 1 goal for road density is 0.9 linear mile per mi², which does not include temporary roads, snowmobile/ATV trails, and some low standard special use roads. The average road density for the SNF (outside the Boundary Waters Canoe Area Wilderness) currently is 0.8 linear mi per mi².

Effects from road construction/reconstruction are expected to be negligible because wolves typically avoid areas with high human use and activity, including noise. Road work (including tree felling) will total approximately 17 mi and will be scattered across the four districts, thereby resulting in almost no change to current road density. Also, temporary roads will be decommissioned upon Project completion. For the same reason, disturbance to denning wolves likely will be negligible. Potential effects from the associated 1,746 ac of timber harvest on State and County lands will be foraging habitat modification for wolves' primary prey species (deer and moose) in the short-term, but young regenerating forest (predominantly aspen) will benefit these species in the near future. Based on this information, the Service concurs with your "may affect, not likely to adversely affect" determination for gray wolf.

Canada Lynx: The BA indicated that from 2000-2014, 235 individual lynx genotypes were identified from scat and hair samples, and from October 2013 to May 2014, 68 unique individuals were identified on the SNF. Various types of evidence support successful lynx reproduction in northeastern Minnesota, including at least 8 family groups during winter 2013-2014.

The BA's cumulative effects indicated that eight Lynx Analysis Units (LAU) may be affected by the Project: LAUs 7, 8, 10, 11, 12, 27, 29, and 33, although it's unknown whether State and County harvest units will occur within the same LAUs as the access roads due to lack of precise harvest unit location data. Projected timber harvest on State and County lands is estimated to be 1,746 ac across the Project area, which is also minimal relative to the size of lynx home ranges. All LAUs through which roads will be (re)constructed will have \leq 4 percent lynx habitat

currently in an unsuitable condition after harvest on State and County lands – well below the 30 percent threshold in an individual LAU. In addition, the BA indicated that typically it takes only 3 to 12 years after timber harvest for snowshoe hare winter habitat to regenerate.

Potential effects to lynx from roads and associated timber harvest are likely minimal at the population level. The BA indicated that the main concern from the proposed roads is winter use where snow is compacted, in turn, potentially providing access for competitors such as coyotes. The total distance of proposed long-term roads that would be compacted during winter is only 0.34 mi and distance of temporary roads with snow compaction is 26.6 mi, or approximately 4 mi per year across the Project area (four Ranger Districts), which is minimal relative to the size of lynx home ranges. Lynx use backcountry roads, trails, and railroad beds for travel when available and between 2000 and 2011, four lynx were killed by vehicle strikes. However, the probability of a lynx being killed on these low use and low speed roads is minimal across the Forest.

In addition to three 2013 Lynx Conservation Assessment and Strategy conservation measures related to roads and over-the-snow routes (see BA, pp. 9-10), the SNF's Forest Plan provides the following required standards and guidelines for lynx:

- G-WL-3: Limit disturbance within each LAU on NFS land to no more than 30% of the total lynx habitat (all ownerships) within an LAU in unsuitable condition.
- S-WL-2: In LAUs on NFS land, allow no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves lynx habitat through a net reduction of compacted snow areas.

The Forest will be in compliance with all measures. Based on this information, the Service concurs with your “may affect, not likely to adversely affect” determination for lynx.

Please contact the Service if the project changes or new information reveals effects of the proposed action to proposed or listed species or critical habitat to an extent not covered in your biological assessment. If you have any questions or comments on this conference opinion, please contact Ms. Ann Belleman, Fish and Wildlife Biologist, via email at ann_belleman@fws.gov.

Sincerely,



Pete Fasbender
Field Supervisor

Enclosure

cc: Susan Catton, Forest Wildlife Biologist (scatton@fs.fed.us)
Sarah Malick-Wahls, Wildlife Biologist (smalickwahls@fs.fed.us)

BIOLOGICAL OPINION

**Effects to the
Northern Long-eared Bat
from the 2015 Special Use Projects; Kawishiwi, Laurentian,
Gunflint, and Tofte Ranger Districts on the Superior National
Forest**

FWS No. 03E19000-2015-F-0233

Prepared by:
U.S. Fish and Wildlife Service
Twin Cities Field Office

November 2015

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INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) based on our review of the U.S. Forest Service's proposed activities on the Superior National Forest's (USFS, Forest, or SNF) 2015 Special Use Projects, and their effects on the northern long-eared bat (*Myotis septentrionalis*; NLEB) in accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The Biological Assessment (BA or Project), dated August 3, 2015, and letter, dated August 11, requesting consultation on the Project were received in our office on August 17, 2015. The USFS determined that all activities addressed in the BA are unlikely to result in adverse effects to any other federally-listed species. Therefore, this BO addresses only the NLEB.

This BO is based on information provided in the BA. A complete administrative record of this consultation is on file at the Service's Twin Cities Field Office.

Interim 4(d) for the NLEB

On April 2, 2015, the Service has published a species-specific rule pursuant to section 4(d) of the ESA for NLEB (80FR17974). Section 4(d) of the ESA states that:

Whenever any species is listed as a threatened species ... the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species (16 U.S.C. 1533(d)).

The Service's interim 4(d) rule for NLEB exempts the take of NLEB from the section 9 prohibitions of the ESA, as follows:

- (1) Take that is incidental to forestry management activities, maintenance/limited expansion of existing rights-of way, prairie management, projects resulting in minimal (<1 acre) tree removal, provided these activities:
 - a. Occur more than 0.25 mile (0.4 km) from a known, occupied hibernaculum;
 - b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and
 - c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).
- (2) Removal of hazard trees (no limitations).
- (3) Purposeful take that results from:
 - a. Removal of bats from and disturbance within human structures, if the actions comply with all applicable state regulations; and
 - b. Capture, handling, and related activities for NLEBs by individuals permitted to conduct these same activities for other species of bat until May 3, 2016.

Thus, any take of NLEB resulting from activities that are implemented in compliance with the conservation measures, as necessary, is exempted from section 9 prohibitions by the interim 4(d) rule, and does not require further incidental take authorization. Note that no conservation measures are required as part of the interim 4(d) rule for forest management actions that would affect only areas with no known roost trees and no known hibernacula. The Forest currently has known roost trees and four known or suspected NLEB hibernacula within 5 miles of the Forest boundary, and will incorporate the above conservation measures into its proposed actions as appropriate.

However, the interim 4(d) rules do not afford exemption from the ESA's section 7 procedural requirements. Therefore, consultation remains appropriate when actions (even those within the scope of the interim 4(d) rule) are funded, authorized or carried out by a federal agency. This is because the purpose of section 7 consultation is broader than the mere evaluation of take and issuance of an Incidental Take Statement; such consultations fulfill the requirements of section 7(a)(2) of the ESA, which directs that all federal agencies insure that their actions are not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of designated critical habitat.

Consultation History

The SNF, along with the Chippewa and Chequamegon-Nicolet National Forests, developed a list in spring 2015 of all on-going and proposed projects, for the purpose of prioritizing numerous ESA section 7 consultations resulting from the listing of NLEB. The Service agreed and completes each project chronologically according to that list, which has since been revised twice; after the first 10 projects were completed, additional projects were included on the list, with the most recent revision in September 2015. This project is number 6 of 20 on the most recent priority list. Your BA and letter, dated August 3, 2015 and August 11, 2015, respectively, were received in our office on August 17, 2015. The Service is issuing this final BO in November 2015, concluding formal consultation on the Project. The BA and email transmissions with Ms. Sarah Malick-Wahls, Wildlife Biologist, form the basis for this BO.

DESCRIPTION OF PROPOSED ACTION

As defined in the ESA Section 7 regulations (50 CFR 402.02), “action” means “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas.” The “action area” is defined as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.” The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present federal, state, or private activities, as well as the cumulative effects of reasonably certain future state or private activities within the action area.

The following project description summarizes the BA’s detailed information (pp. 5-6). There are 22 Special Use road permit projects proposed within four Ranger Districts (Gunflint, Kawishiwi,

Laurentian, and Tofte) (see BA Table 2, pp. 3-5 for a complete list, including project locations). The permits authorize construction or re-construction of roads/roadbeds and consist of three types of road use: (1) temporary access to state or county lands; (2) long-term access to two MN DNR stream monitoring sites; and (3) one permanent access to private property (see Table 1 below). Additional information on the Superior National Forest background and description can be found in the BA, which is incorporated by reference.

- Temporary road permits (19) will provide access to state or county timber harvest units ranging in size from 12 acres (ac) to 176 ac (total estimated harvest is approximately 1,746 ac). The exact location and size of harvests is unknown. The access roads will be 20-foot (ft) wide and designed for all-season use (9), summer use (2), or winter use (8), totaling 16.5 miles (40 ac). Of that, 12 miles (mi) will be on pre-existing road or trail corridors. Permits usually average 5 years, after which the roads will be obliterated. All activities associated with these types of permits likely will be completed by 2021.
- Long-term access to MN DNR monitoring sites will be issued for 15 years and includes building two new 16-ft wide roads for year-round use, totaling 0.28 mi (0.54 ac).
- The new 20-ft wide permanent road will provide year-round access to private property and totals 0.06 mi (0.14 ac).

Table 1. Special Use Road Access (2015 to 2021) (adapted from BA Table 3, p. 6).

Type Road Access (# projects)	New Temp Use (Ac)*	Existing Temp Use (Ac)*	Permanent Use** (Ac)*	Total Acres*
Winter	6.8	11.4		18.2
Summer	1.9	2.5		4.4
All-season	2.3	15.3		17.5
Private property			0.1	0.1
MN DNR Monitoring sites			0.5	0.5
TOTAL ACRES	11	29.2	0.6	40.7
TOTAL MILES	16.6***		0.3	
*Rounded to nearest 0.1 ac; **Long-term and permanent use roads combined; ***Temporary use roads combined				

The Forest used three indicators to assess potential effects to NLEB (BA pp. 14-16) and focused on acres of new road corridors being created versus pre-existing road corridors being re-opened for use. Their rationale is that pre-existing corridors will not have roost-sized trees, so will only require brushing of smaller sized vegetation. The three indicators are as follows:

Indicator 1: Acres of tree clearing (trees greater than 9 years old) planned to occur from April 1 through September 30 (this indicator focuses on impacts to individuals);

Indicator 2: Acres of tree clearing (trees greater than 9 years old) planned within suitable summer habitat; and

Indicator 3: Acres of tree clearing (trees greater than 9 years old) planned within 5 miles of hibernacula.

Projects/Actions that Will Have No Effect or Are Not Likely to Adversely Affect the NLEB

Actions that will have no effect on NLEB are those that involve no tree clearing and/or no removal of vegetation, and would not alter the suitability of any potential NLEB habitat, including known NLEB hibernacula or any cave habitats. There will be no tree clearing within 5 mi of known hibernacula (Indicator 3), so there will be no effects.

Activities that may affect but are not likely to adversely affect NLEB include those: occurring during the winter (October-March) that will not alter habitat to the extent that indirect adverse effects are likely to occur to NLEBs when they return to the affected area after hibernation; taking place when bats are absent from summer roosting habitat; and not affecting any known or suspected staging or swarming areas. Based on these criteria, proposed tree clearing during the winter season, which will affect only small acreages of habitat scattered across most of the Forest, and brushing on pre-existing roadbeds without suitable summer roosting habitat are not likely to adversely affect NLEB.

However, the BA's description of proposed activities included various combinations of road use (temporary versus long-term/permanent), new versus pre-existing roadbeds affecting the degree of tree clearing, and timing of activities (winter versus summer), as well as associated timber harvest on state and county lands. To avoid confusion in reporting the potential effects (not likely to affect versus likely to adversely affect) from each combination of activities and associated numbers of permits, miles/acres, etc., we have consolidated all combinations as likely to adversely affect NLEB. We recognize that some combinations may affect, but are not likely to adversely affect NLEB (e.g. tree clearing on <1 ac during winter) as mentioned above; however, the differences in potential insignificant versus adverse effects from the various combinations of activities and conditions across the Forest are small. Thus, the maximum amount of tree removal reported in the BA is less than 41 acres for access roads (BA Table 3, p. 6) but potential adverse effects will occur on fewer acres than this amount on the Forest. Associated timber harvest on state and county lands is approximately 1,746 ac, although some harvest will be conducted during winter which will reduce the level of potential adverse effects.

Projects/Actions that Are Likely to Adversely Affect the NLEB

Most tree removal activities that take place in summer roosting habitat during the summer roosting period (April 1 to September 30) may affect and are likely to adversely affect the NLEB. However, tree removal activities, such as tree clearing for road access, are likely to adversely affect the NLEB when they affect suitable summer roosting habitat, even when they occur outside of the summer roosting period (October 1 to March 31). As mentioned above, we have consolidated all combinations of the 22 Special Use project activities as may affect, likely

to adversely affect the NLEB, but recognize that potential adverse effects will occur on less than the Project total of approximately 41 acres on the Forest and the approximately 1,746 acres of timber harvest on state and county lands.

All tree removal activities in this Project have the potential to adversely affect NLEB roosting and/or foraging habitat. The interim 4(d) rule (80 FR 17974) states that in areas affected by WNS, all incidental take prohibitions apply except that take attributable to forest management practices, maintenance and limited expansion of transportation and utility rights-of-way, removal of trees and brush to maintain prairie habitat, and limited tree removal projects shall be excepted from the take prohibition, provided these activities protect known maternity roosts and hibernacula. The proposed types of tree removal for temporary road access timber harvest are included under the definition of forest management used for the rule, which states: “(F)orestry management is the practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management utilization and conservation of forests to meet specific goals and objectives (Society of American Foresters (SAF), http://dictionaryofforestry.org/dict/term/forest_management). Forestry management includes the suite of activities used to maintain and manage forest ecosystems, including, but not limited to: timber harvest and other silvicultural treatments, prescribed burning, invasive species control, wildlife openings, and temporary roads.” All tree removal activities in this Project that may adversely affect NLEB are within the scope of activities covered by the interim 4(d) rule. Moreover, any incidental take that results from their implementation is exempt from the section 9 prohibitions as long as they include the interim 4(d) rule’s conservation measures. The Service concurs that these activities are likely to adversely affect the NLEB and the remainder of the BO will address these activities.

The USFS included conservation measures to minimize potential adverse impacts of various activities as part of their project description. The Service has analyzed the effects of the proposed actions considering that the projects will be implemented as proposed, which include the conservation measures listed below.

Conservation Measures

Conservation measures are those actions taken to benefit or promote the recovery of the species. These actions taken by the Federal agency that serve to minimize or compensate for project effects on the species under review and are included as an integral portion of the proposed action.

To be in compliance with the interim 4(d) rule for northern long-eared bat, the USFS has committed to the following conservation measures as part of the Project description:

- 1) All proposed activities will occur more than 0.25 mile (0.4 km) from a known, occupied hibernaculum.

2) The USFS will avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31).

3) The USFS will avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).

In addition, the BA (p. 17) indicated that, “(I)f a bat roost is located at any time during operations, cease operations and notify the District Biologist for instructions on how to proceed.”

STATUS OF THE SPECIES

Refer to the final rule (80FR17974) for the best available information on NLEB life history and biology, threats, distribution, and overall status. The following is summarized from that rule.

Life History and Biology

The NLEB is a temperate, insectivorous, migratory bat that hibernates in mines and caves in the winter and spends summers in wooded areas. The key stages in its annual cycle are: hibernation, spring staging and migration, pregnancy, lactation, volancy/weaning, fall migration and swarming. NLEB generally hibernate between mid-fall through mid-spring each year. Spring migration period likely runs from mid-March to mid-May each year, with timing varying depending on the portion of the range. Females depart shortly after emerging from hibernation and are pregnant when they reach their summer area. Parturition (birth) occurs in late May or early June (Caire et al. 1979, p. 406; Easterla 1968, p. 770; Whitaker and Mumford 2009, p. 213) but may occur as late as July (Whitaker and Mumford 2009, p. 213), with nursing continuing until weaning, which is shortly after young become volant in mid- to late-July. Fall migration likely occurs between mid-August and mid-October.

Summer habitat and ecology

Suitable summer habitat¹ for NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts, as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure.

Many species of bats, including the NLEB, consistently avoid foraging in or crossing large open areas, choosing instead to use tree-lined pathways or small openings (Patriquin and Barclay 2003, Yates and Muzika 2006). Further, wing morphology of the species suggests that they are

¹ See the Service’s current summer survey guidance for our latest definitions of suitable habitat: <http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html>.

adapted to moving in cluttered habitats. Thus, isolated patches of forest may not be suitable for foraging or roosting unless the patches are connected by a wooded corridor.

Upon emergence from the hibernacula in the spring, females seek suitable habitat for maternity colonies (typically consisting of females and young). NLEB actively form colonies in the summer (Foster and Kurta 1999) and exhibit fission-fusion behavior (Garroway and Broders 2007), where members frequently coalesce to form a group (fusion), but composition of the group is in flux, with individuals frequently departing to be solitary or to form smaller groups (fission) before returning to the main unit (Barclay and Kurta 2007). As part of this behavior, NLEBs switch tree roosts often (Sasse and Pekins 1996), typically every 2 to 3 days (Foster and Kurta 1999; Owen et al. 2002; Carter and Feldhamer 2005; Timpone et al. 2010). NLEB maternity colonies range widely in size, although a maximum of 30-60 individuals may be most common early in the season, with the colony size decreasing post-lactation of young (Service 2014). NLEB show some degree of interannual fidelity to single roost trees and/or maternity areas. Male NLEB are routinely found with females and young in maternity colonies. NLEB use networks of roost trees often centered around one or more central-node roost trees (Johnson et al. 2012). NLEB roost networks also include multiple alternate roost trees and male and non-reproductive female NLEB may also roost in cooler places, like caves and mines (Barbour and Davis 1969, Amelon and Burhans 2006).

NLEB roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags [typically ≥ 3 inches diameter at breast height (dbh)]. NLEB are known to use a wide variety of roost types, using tree species based on presence of cavities or crevices or presence of peeling bark. NLEB have also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable).

Females give birth to a single offspring, typically in late-May or early June (Caire *et al.* 1979, p. 406; Easterla 1968, p. 770; Whitaker and Mumford 2009, p. 213). Lactation then lasts 3 to 5 weeks with pups typically becoming volant (able to fly) between early July and early August.

Migration

Males and non-reproductive females may summer near hibernacula, or migrate to summer habitat further from their hibernaculum. The northern long-eared bat is not considered to be a long distance migrant. It typically migrates 40-50 miles from hibernacula. Migration is an energetically demanding behavior for the northern long-eared bat, particularly in the spring when their fat reserves and food supplies are low and females are pregnant.

Winter habitat and ecology

Suitable winter habitat (hibernacula) includes underground caves and cave-like structures (e.g. abandoned or active mines and railroad tunnels). Other landscape features that may also be used by NLEBs during the winter have yet to be documented. Generally, NLEBs remain at hibernacula from October to April, depending on local climate. In southern portions of the

species' range, they may be at hibernacula only from November to December; in some northern areas they may leave hibernacula for summer habitat between March and mid-May.

Hibernacula for NLEBs typically have significant cracks and crevices for roosting; relatively constant, cool temperatures (0-9 degrees Celsius); high humidity; and, minimal air currents. Specific areas where they hibernate have very high humidity and droplets of water are often visible on their fur. Surveyors may find them in small crevices or cracks, often with only the nose and ears visible.

NLEBs tend to roost singly or in small groups, with hibernating population sizes ranging from a just few individuals to around 1,000 (U.S. Fish and Wildlife Service 2014 and unpublished data). The northern long-eared bat exhibits more winter activity than other cave species; individuals often move between hibernacula throughout the winter (Griffin 1940, Whitaker and Rissler 1992, Caceres and Barclay 2000). Northern long-eared bats have shown a high degree of philopatry to the hibernacula used, returning to the same hibernacula every year.

Spring Staging and Fall Swarming habitat and ecology

Upon arrival at hibernacula in mid-August to mid-November, NLEB “swarm,” a behavior in which large numbers of bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in caves during the day. Swarming continues for several weeks and mating occurs during the latter part of the period. After mating, females begin hibernation. Most bats of both sexes hibernate by the end of November (by mid-October in northern areas).

After hibernation ends in late March or early April (as late as May in some northern areas), most NLEB migrate to summer roosts. Females emerge from hibernation before males. Reproductively active females store sperm from autumn copulations through winter and ovulation takes place after the bats emerge from hibernation in spring. The period after hibernation and just before spring migration is typically referred to as “staging,” a time when bats forage and a limited amount of mating occurs. This period can be as short as a day for an individual, but not all bats emerge on the same day.

In general, NLEB use roosts in the spring and fall similar to those selected during the summer. Suitable spring staging and fall swarming habitat is typically within 5 miles of a hibernaculum and consists of forested habitats similar to where they may roost, forage, and travel. This includes forested patches and linear features such as fencerows, riparian forests and other wooded corridors. These wooded areas may be comprised of dense or loose aggregates of trees with variable amounts of canopy closure. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 1,000 feet from the next nearest suitable roost tree, woodlot, or wooded fencerow.

Threats

No other threat is as severe and immediate for the NLEB as the disease white-nose syndrome (WNS). It is unlikely that NLEB populations would be declining so dramatically without the

impact of WNS. Since the disease was first observed in New York in 2007 (later biologists found evidence from 2006 photographs), WNS has spread rapidly in bat populations from the Northeast to the Midwest and the Southeast. Population numbers of NLEB have declined by 99 percent in the Northeast, which along with Canada, has been considered the core of the species' range. Although there is uncertainty about how quickly WNS will spread through the remaining portions of these species' ranges, it is expected to spread throughout their entire ranges. In general, the Service believes that WNS has significantly reduced the redundancy and resiliency of the NLEB.

Although significant NLEB population declines have only been documented due to the spread of WNS, other sources of mortality could further diminish the species' ability to persist as it experiences ongoing dramatic declines. Specifically, declines due to WNS have significantly reduced the number and size of NLEB populations in some areas of its range. This has reduced these populations to the extent that they may be increasingly vulnerable to other stressors that they may have previously had the ability to withstand. These impacts could potentially be seen on two levels. First, individual NLEB sickened or struggling with infection by WNS may be less able to survive other stressors. Second, NLEB populations impacted by WNS, with smaller numbers and reduced fitness among individuals, may be less able to recover making them more prone to extirpation. The status and potential for these impacts will vary across the range of the species.

Bats affected but not killed by WNS during hibernation may be weakened by the effects of the disease and may have extremely reduced fat reserves and damaged wing membranes. These effects may reduce their capability to fly or to survive long-distance migrations to summer roosting or maternity areas.

In areas where WNS is present, there are additional energetic demands for NLEBs. For example, WNS-affected bats have less fat reserves than non-WNS-affected bats when they emerge from hibernation (Reeder et al. 2012; Warnecke et al. 2012) and have wing damage (Meteyer et al. 2009; Reichard and Kunz 2009) that makes migration and foraging more challenging. Females that survive the migration to their summer habitat must partition energy resources between foraging, keeping warm, successful pregnancy and pup-rearing, and healing and may experience reduced reproductive success. In addition, with wing damage, there may be an increased chance of WNS-affected bats being killed or harmed as a result of proposed actions. Again, this is particularly likely if timber harvest or burns are conducted early in the spring (April – May) when bats have just returned, have damaged wings, and are exposed to colder temperatures when torpor is used more frequently.

Over the long-term, sustainable forestry benefits NLEB by maintaining suitable habitat across a mosaic of forest treatments. However, forest practices can have a variety of impacts on the NLEB depending on the quality, amount, and location of the lost habitat, and the time of year of clearing. Depending on their characteristics and location, forested areas can function as summer maternity habitat, staging and swarming habitat, migration or foraging habitat, or sometimes, combinations of more than one habitat type. Impacts from tree removal to individuals or

colonies would be expected to range from indirect impact (e.g., minor amounts of forest removal in areas outside NLEB summer home ranges or away from hibernacula) to minor (e.g., largely forested areas, areas with robust NLEB populations) to significant (e.g., removal of a large percentage of summer home range, highly fragmented landscapes, areas with WNS impacts).

Lastly, there is growing concern that bats, including the NLEB (and other bat species) may be threatened by the recent surge in construction and operation of wind turbines across the species' range. Mortality of NLEB has been documented at multiple operating wind turbines/farms. The Service is now working with wind farm operators to avoid and minimize incidental take of bats and assess the magnitude of the threat.

Rangewide Status

The NLEB ranges across much of the eastern and north central United States, and all Canadian provinces west to the southern Yukon Territory and eastern British Columbia (Nagorsen and Brigham 1993; Caceres and Pybus 1997; Environment Yukon 2011) (Figure 1). In the United States, the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east through the Gulf States to the Atlantic Coast (Whitaker and Hamilton 1998; Caceres and Barclay 2000; Amelon and Burhans 2006). The species' range includes the following 37 states (plus the District of Columbia): Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming. Historically, the species has been most frequently observed in the northeastern United States and in Canadian Provinces, Quebec and Ontario, with sightings increasing during swarming and hibernation (Caceres and Barclay 2000). However, throughout the majority of the species' range it is patchily distributed, and historically was less common in the southern and western portions of the range than in the northern portion of the range (Amelon and Burhans 2006).

Although they are typically found in low numbers in inconspicuous roosts, most records of NLEB are from winter hibernacula surveys (Caceres and Pybus 1997). More than 780 hibernacula have been identified throughout the species' range in the United States, although many hibernacula contain only a few (1 to 3) individuals (Whitaker and Hamilton 1998). Known hibernacula (sites with one or more winter records of NLEBs) include: Alabama (2), Arkansas (41), Connecticut (8), Delaware (2), Georgia (3), Illinois (21), Indiana (25), Kentucky (119), Maine (3), Maryland (8), Massachusetts (7), Michigan (103), Minnesota (15), Missouri (more than 269), Nebraska (2), New Hampshire (11), New Jersey (7), New York (90), North Carolina (22), Oklahoma (9), Ohio (7), Pennsylvania (112), South Carolina (2), South Dakota (21), Tennessee (58), Vermont (16), Virginia (8), West Virginia (104), and Wisconsin (67). NLEB are documented in hibernacula in 29 of the 37 states in the species' range. Other states within the species' range have no known hibernacula (due to no suitable hibernacula present, lack of survey effort, or existence of unknown retreats).

Northern Long-Eared Bat (*Myotis septentrionalis*) Range

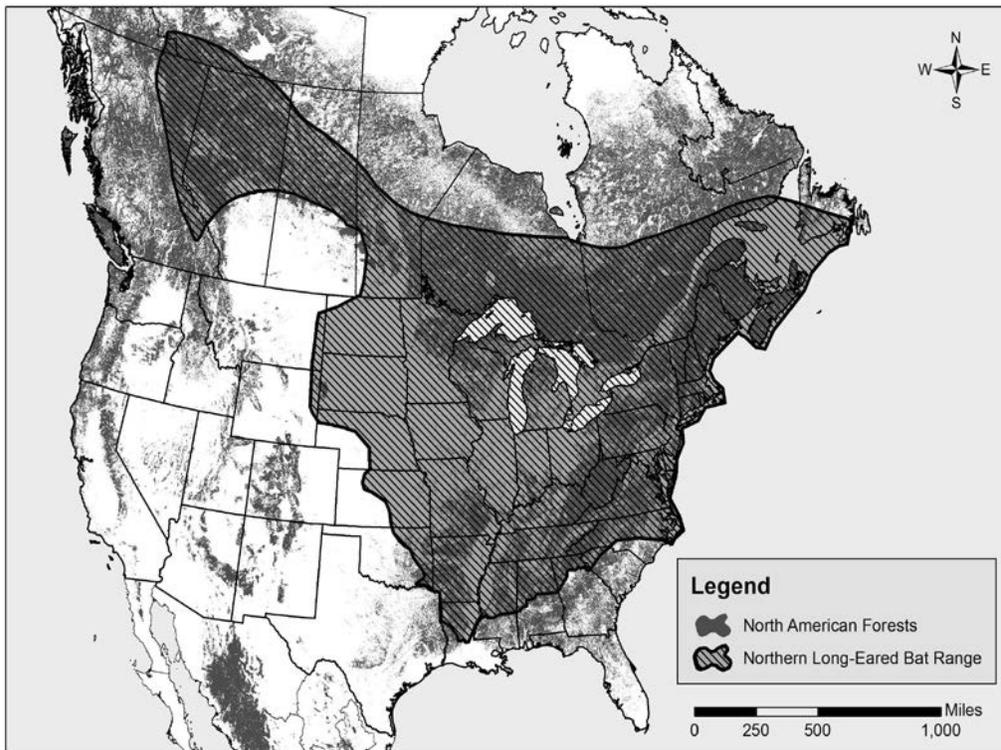


Figure 1. Northern long-eared bat range.

The current range and distribution of NLEB must be described and understood within the context of the impacts of WNS. Prior to the onset of WNS, the best available information on NLEB came primarily from surveys (mostly focused on Indiana bat or other bat species) and some targeted research projects. In these efforts, NLEB was very frequently encountered and was considered the most common myotid bat in many areas. Overall, the species was considered to be widespread and abundant throughout its historic range (Caceres and Barclay 2000).

WNS has been particularly devastating for NLEB in the northeast, where the species was believed to be the most abundant. There are data supporting substantial declines in NLEB populations in portions of the Midwest due to WNS. In addition, WNS has been documented at more than 100 NLEB hibernacula in the southeast, with apparent population declines at most sites. WNS has not been found in any of the western states to date and the species is considered rarer in the western extremes of its range. We expect further declines as the disease continues to spread across the species' range.

Status of the Northern Long-eared Bat in Minnesota

Prior to 2014, there was little information on NLEB summer populations in the state. In 2014, passive acoustic surveys conducted at a new proposed mining area in central St. Louis County

detected the presence of NLEB at each of 13 sites sampled. Calls that were assigned to NLEB accounted for approximately 14 percent of all recorded bat calls (Smith *et al.* 2014). Also in 2014, acoustic and mist-net data were collected by a pipeline project proponent that surveyed an approximately 125-ft-wide and 300-mile-long corridor through the northern third of the state. Positive detections were recorded in Hubbard, Cass, Crow Wing, Aitkin, and Carlton Counties, and NLEBs were the most common species captured by mist-net (Merjent 2014). In 2015, on-going mist-net surveys at Camp Ripley Training Center, Morrison County, resulted in capture of 7 NLEB (15 percent of total captures). Mist-net surveys on the Superior and Chippewa National Forests resulted in the capture of 45 NLEBs (59 percent of total captures) and 20 NLEBs (34 percent of total captures), respectively (Swingen et al. 2015).

The NLEB is known from 15 hibernacula in Minnesota; however, the status of most is unknown. An estimated 3,000 NLEB are thought to hibernate within the largest known hibernaculum in Minnesota, the Soudan Mine in St. Louis County. WNS has not been detected in Minnesota; however, the fungus that causes WNS was detected in 2011–2012. Currently, only Soudan Mine and Mystery Cave in Minnesota are known to harbor the fungus that causes WNS and to our knowledge, the fungus has not actually caused WNS in bats within the state.

Critical Habitat

Critical habitat has not been proposed for the NLEB.

Conservation Needs of the Species

The species' conservation needs define what is needed in terms of reproduction, numbers, and distribution to ensure the species is no longer in danger of extinction. The conservation needs should be defined in the species' recovery outline or plan. Since there is no recovery plan or recovery outline available at this time, we will outline the conservation needs based on our current understanding of the species.

We find that the primary conservation need of the NLEB is to reduce the threat of WNS. This includes minimizing mortality in WNS-affected areas and slowing the rate of spread into currently unaffected areas. In addition, NLEB that continue to exist within WNS-affected areas need to be able to continue to survive and reproduce in order to stabilize and/or increase the populations. This can be done by reducing the other threats to the species, as listed above. Therefore, efforts to protect hibernacula from disturbances need to continue. These should include restricting human access to hibernacula particularly during the hibernation period, constructing/installing suitably designed gates where appropriate and maintaining the gates, and restoring microhabitat conditions in hibernacula that have been altered. Efforts should also be made to protect and restore (in some cases) adequate fall swarming habitat around hibernacula. Known maternity habitat should be maintained, and the removal of known roost trees, particularly when pregnant females and/or young are present should be reduced. Research to identify important hibernacula and summer areas and to delineate the migratory relationship between summering and wintering populations should also be pursued.

ENVIRONMENTAL BASELINE

The Environmental Baseline analyzes the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and the ecosystem within the action area.

Action Area

Action area, as defined by the ESA's implementing regulations (50 CFR 402.02), is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Action is defined in the regulations as "...all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to: (a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air.

For the SNF's Project, the area where "land, water, or air" that is likely to be affected is land administered by the USFS where tree removal and associated actions authorized by the Forest would occur. The activities considered in this BO are dispersed throughout four of the five Ranger Districts in the SNF; therefore, we consider the lands within the SNF's Gunflint, Laurentian, Kawishiwi, and Tofte Ranger Districts' boundary as the action area. However, because most of the NLEB habitat information in the BA is reported for the entire Forest rather than by individual districts, we rely on the forest-wide information. The entire Forest boundary encompasses over 3 million acres (includes federal, state, county, and other ownerships), of which 445,000 acres are water.

Status of the Species in the Forest, including the Action Area

The SNF initiated annual acoustic monitoring in 2009. From 2013 to 2015, mist-netting, radio-telemetry, habitat characterization, and acoustic survey efforts have been completed and while the sample size is still small, available data are providing insights into bat presence and reproductive female NLEB habitat use. Acoustic monitoring data will be used to identify baseline bat activity levels and observe how those levels may change in response to WNS, but completed data analyses are not expected until late 2015. In 2013, 34 bats were captured at eight locations, of which 13 were NLEB; in 2014, 44 bats were captured at 5 sites on the SNF, of which 24 were NLEB; and in 2015, 76 bats were captured at 10 locations, of which 45 were NLEB. Both reproductive adults and non-reproductive juveniles have been captured and 5 reproductive female NLEB in 2013 and 10 reproductive female NLEB in 2014 were equipped with radio-transmitters, which resulted in subsequent detections of multiple maternity roost sites. In 2013, three maternity roosts were identified in live aspen and four additional maternity roosts were in dead aspen and white pine. In 2014, 14 maternity roosts were in aspen (13 live and 1 dead), 2 in live red maple, 1 in live black ash and 1 in an unknown snag. In 2015, 7 transmitters were deployed on adult female bats (6 NLEB) on the Forest, resulting in identification of 21 roost trees, with the most common being trembling aspen (*Populus tremuloides*; 10) and red maple (*Acer rubrum*; 4) (Swingen et al. 2015).

Other results of mist-net surveys conducted in 2013 and 2014 in Minnesota have found a range of relative abundance for NLEB. Based on the frequency and proximity to SNF of positive NLEB detections in Minnesota and the prevalence of suitable habitat for the species on the SNF, it is reasonable to assume that the species may be widespread in the action area. Because survey data analyses are not yet complete, we cannot estimate roost tree density or the proportion of the SNF that is inhabited by NLEB within a useful level of precision. The SNF is also working with the Minnesota Department of Natural Resources, the Chippewa National Forest, and the Service to increase our collective knowledge of NLEB distribution and habitat use in northern Minnesota.

Habitat Conditions in the Forest, including the Action Area

The SNF assumes that forest comprised primarily of trees greater than 9 years old functions as suitable summer habitat for the NLEB in the action area. This type of habitat is abundant and well distributed across the SNF on public lands (federal, state and county; see Table 5 in the BA). The NLEB typically uses summer habitats between early April and late September (Nordquist 2015). On the SNF, suitable summer habitat for the NLEB is distributed among several forest types, but is mostly comprised of hardwood forest types, especially aspen/birch (see Table 6 in the BA).

A pilot study initiated by the SNF in 2013 confirmed that northern long-eared bats utilize cracks and crevices in live and dead aspen (*Populus tremuloides*), live maple (*Acer rubrum*), live black ash (*Fraxinus nigra*) and white pine (*Pinus strobus*) (Grandmaison et al. 2013). Seven maternity roost trees were located in 2013 and 18 in 2014 on the SNF. Live aspen were the predominant trees used, ranging in size from 9 – 18 inches dbh (Catton 2014). Data from this study should be considered preliminary as the study continues, but thus far has confirmed the following: maternity roost trees were large (dbh > 11 in.) with heights ranging from 23.5 – 70.6 feet; canopy closure in the stands around roost trees was high (62 – 98%), although maternity roost trees had some level of exposure to sunlight during the day. In 2014, lactating females were found between mid-June and early July (Catton 2014).

There are four known or suspected NLEB hibernacula within 5 miles of the SNF. Section 30 Mine is located on private land just outside of Ely, Minnesota and NLEBs were documented wintering in this site in the 1990's. The mine is not monitored on a regular basis. Sudan Mine, the largest known hibernaculum in the state, is located approximately 5 miles outside the SNF boundary. A third known hibernaculum is located at Tettegouche State Park and is located approximately 4 miles outside of the SNF boundary - about 9 miles from the nearest USFS lands. This site is also not regularly monitored but was known to house wintering NLEBs in 1990 and 2003. The fourth site is the Jack Lake mine, located within the Boundary Waters Canoe Areas Wilderness on the Tofte Ranger District. This is a suspected hibernaculum and has never been monitored in the winter for bats: however during a SNF site visit in September 2014, bats were found using it.

The Forest also contains a small amount of swarming and staging area. A total of 15,150 acres of National Forest lands meet the criteria for swarming or staging areas (1.3% of the Superior

National Forest). Fall swarming dates at Soudan mine have been documented as early August to mid-October and spring staging activity has been documented from late April to mid-June (Nordquist 2015).

Conservation Needs of the Species in the Action Area

The conservation needs of the species in the action area are similar to the needs rangewide. The SNF provides habitat for summering, migrating, staging and swarming NLEBs. Therefore, within the action area the conservation needs include: 1) providing suitable habitat conditions for foraging and roosting by the NLEB; 2) reducing the removal of roost trees; 3) searching for previously unidentified areas of maternity and hibernation activity; and, 4) conducting research to understand the migration patterns of the NLEB that use the area during the summer; during spring and fall staging and swarming periods; and, if hibernacula are found in the action area, during winter.

The BA indicated that the Forest has initiated NLEB acoustic monitoring routes to identify baseline bat activity levels and observe how those levels change over time. Results of those studies were summarized briefly (see the previous section). The Forest is also working in partnership with the Minnesota Department of Natural Resources, the Chippewa National Forest, and the Service to further their knowledge of NLEB distribution and habitat use in northern Minnesota. These measures, in addition to the continued implementation of conservation measures required under the Forest Plan, will contribute to conservation needs of the NLEB in general and within the action area.

EFFECTS OF THE ACTION

This BO evaluates the anticipated effects of 22 Special Use road permit projects proposed within four Ranger Districts on the Superior National Forest. These projects will affect up to 41 acres of potential NLEB habitat on the Forest. Potential effects to the NLEB include direct and indirect effects. Direct effects occur when bats are present while the activities are being conducted; indirect effects occur later in time. Effects will vary based on the type of the proposed activity. Potential effects from timber harvest on state and county lands are addressed in the Cumulative Effects section.

Our analysis of effects for NLEB entails: (1) evaluating individual NLEB exposure to action-related stressors and the bats' likely responses; (2) integrating those individual effects (exposure risk and subsequent response) to discern the consequences to the populations to which those individuals belong; and (3) determining the consequences of any population-level effects to the species rangewide. If we find that the actions are unlikely to affect the rangewide numbers, reproduction, and distribution of the species in a way that can be measured or described, we conclude that the agency's actions are not likely to jeopardize the continued existence of the species.

Effects to Hibernating Bats at or Near Hibernacula

As previously mentioned, there will be no effects to hibernating bats at or near hibernacula.

Effects to Bats during Spring/Summer and/or to Spring/Summer Habitat

Tree Removal Associated with Road Construction and Other Activities

Tree clearing and removal will occur as a result of temporary and long-term/permanent road construction. Tree removal activities for road access will take place on no more than 41 ac of suitable summer habitat during the period when NLEB may be present. We assume the tree clearing will be similar to linear clear-cuts in some cases and single tree selection in others, depending on roadbed and other existing conditions. Tree removal for individual access roads will range in size from 0.14 to 3.76 ac – areas that are small in extent. Within the areas affected by these activities, NLEBs are likely to be harmed, harassed, or killed as a result of tree removal during the spring to early fall roosting period, April 1 to September 30. Some tree removal will take place in suitable summer habitat outside of this period and will result in only indirect effects to NLEB.

Death/Injury

Risk of death or injury of individual NLEB from tree removal varies depending on the timing of activities, their location, and extent of the area affected. In the BA, the Forest assumed that tree clearing that occurs between April 1 and September 30 in habitat comprised of trees greater than nine-years old could result in direct impacts to NLEB.

The timing of forest management activities greatly influences the likelihood of exposure and the extent of impacts on individual bats and their populations. Female NLEB typically roost colonially, with their largest population counts occurring in the spring or early summer, presumably as one way to reduce thermal costs for individual bats (Foster and Kurta 1999). Although bats may flee their roosts during tree removal, removal of occupied roosts during the active season while bats are present (spring through fall) is likely to cause injury or mortality to some roosting bats. Bats are likely to be injured or killed as a result of tree felling in the spring when bats often use torpor (temporary unresponsive state) to survive periods of cool weather and low prey availability. Bats are also likely to be killed or injured during early to mid-summer (approximately June-July) when flightless pups or inexperienced flying juveniles are present. Removal of trees outside these periods is less likely to result in direct injury or mortality when the majority of bats can fly and are more dispersed.

Lastly, the likelihood and extent of impacts are influenced by the amount of tree removal relative to the amount of remaining suitable roosting and foraging habitat from which affected bats may select. NLEBs use multiple roosts throughout the season. Therefore, only a certain number of roosts are anticipated to be occupied in a single day or year. Larger areas of tree removal have greater risk than when smaller areas are affected.

No more than 41 ac will be affected by tree clearing and some will occur only outside of the summer roosting period. No direct effects to the NLEB will occur in these areas because the species will not be present during tree removal. In the remaining areas, however, the NLEB

could be adversely affected as a result of the significant alteration of habitat (this type of effect is described in the following sub-section).

NLEBs could be harmed, harassed, or killed as a result of tree removal activities that take place when the species is present in summer roosting habitat. The NLEB will only be exposed to these types of adverse effects on no more than 41 ac with the action area. Effects will not occur simultaneously across the action area, but will instead occur over an approximately 5-year time period. NLEB habitat is abundant and well distributed throughout the Forest and there will be large areas of intact forested habitat adjacent to or near each access road area. There are 2,650,931 acres of potential NLEB habitat on the entire Forest, including the action area, of which 2,434,526 acres (92 percent) are currently considered suitable for NLEB use during the summer roosting period. Excluding the Boundary Waters Canoe Area Wilderness, there are 1.23 million ac of NLEB habitat on the Forest, of which 1.19 million ac are currently suitable for NLEB.

Response to Removal or Alteration of Roosting/Foraging Habitat

Tree removal will occur on no more than 41 ac, which is a small area relative to available NLEB habitat in the action area and Forest. However, adverse effects to NLEB from habitat alteration (primarily tree removals that are equivalent to clearcuts) are still possible. The best available data indicate that the NLEB shows a varied degree of sensitivity to timber harvesting practices (Menzel et al. 2002, Owen et al. 2002). In central Arkansas, the three classes of mixed pine-hardwood forest that supported the majority of the roosts were partially harvested or thinned, unharvested (50–99 years old), and group selection harvest (Perry and Thill 2007). Forest size and continuity are also factors that define the quality of habitat for roost sites for NLEB. Lacki and Schwierjohann (2001) stated that silvicultural practices could meet both male and female roosting requirements by maintaining large-diameter snags, while allowing for regeneration of forests.

In addition to impacts on roost sites, timber harvest practices can also affect foraging and traveling habitat, and thus, NLEB fitness. In southeastern Missouri, the NLEB showed a preference for contiguous tracts of forest cover (rather than fragmented or wide open landscapes) for foraging or traveling, and different forest types (rather than monoculture) interspersed on the landscape increased likelihood of occupancy (Yates and Muzika 2006). Similarly, in West Virginia, female NLEBs spent most of their time foraging or travelling in intact forest, diameter-limit harvests (70–90 year-old stands with 30–40 percent of basal area removed in the past 10 years), and road corridors, with no use of deferment harvests (similar to clearcutting) (Owen et al. 2003). In Alberta, Canada NLEB avoided the center of clearcuts and foraged more in intact forest than expected (Patriquin and Barclay 2003). On Prince Edward Island, Canada, female NLEBs preferred forested areas more than open areas, with foraging areas centered along forest-covered creeks (Henderson and Broders 2008). In general, NLEBs prefer intact mixed-type forests with small gaps (i.e., forest trails, small roads, or forest covered creeks) in forests with sparse or medium vegetation for foraging and traveling, rather than fragmented habitat or areas that have been clearcut.

Sustainable timber harvest activities do not typically lead to permanent losses of suitable roosting, foraging, or traveling habitat for NLEB. On the contrary, sustainable timber harvest activities are compatible with the long-term maintenance of suitable forested habitat for the species. Many sustainable timber harvest practices will result in little change in terms of the amount or quality of roosting or foraging habitat for NLEB. For example, selective harvest regimes are not anticipated to result in alterations of forest to the point where NLEB would be expected to significantly alter their normal behaviors within the affected areas. The treatment areas will still be forested with only small openings left by the harvest treatment. Similarly, small patch cuts, wildlife openings, and forest roads would be expected to serve as foraging areas or travel corridors and not as barriers to movement. Therefore, the only impacts of concern from many forest treatments are the potential for death or injury during active season tree removal.

However, localized long-term reductions in suitable roosting and/or foraging habitat can occur from various forest practices. For example, large clearcuts (that remove a large portion of a known or assumed home range) would result in a temporary “loss” of forest for NLEB. In these cases, “temporary” would be for many years (amount of time to reproduce suitable roosting/foraging habitat; approximately 9 years on the SNF). Foraging would be possible prior to roosting depending on the juxtaposition of cuts to other forest regimes.

As stated above, NLEB have been found in forests that have been managed to varying degrees and as long as there is sufficient suitable roosting and foraging habitat within their home range and travel corridors between those areas, we would expect NLEB colonies to persist in managed landscapes.

In addition to the type of timber harvest, the extent of impact from timber harvest-related habitat modifications is influenced by the amount of suitable habitat available within and nearby NLEB home ranges. Some portions of the NLEB’s range are more forested than others. In areas with little forest or highly fragmented forests (e.g., western U.S. edge of the range, central Midwestern states; see Figure 1), impact of forest loss would be disproportionately greater than similar sized losses in heavily forested areas (e.g., Appalachians and northern forests). Also, the impact of habitat loss within a NLEB’s home range is expected to vary depending on the scope of removal. Silvis et al. (2014) modeled roost loss of NLEBs and Silvis et al. (2015) removed known NLEB roosts during the winter in the field to determine how this would impact the species. Once removals totaled 20–30 percent of known roosts, a single maternity colony network started showing patterns of break-up. As explained in the Status of Species section, sociality is hypothesized to increase reproductive success (Silvis et al. 2014); thus, smaller colonies are expected to have lower reproductive success.

Clearcutting and similar harvest methods that result in low density of potential roost trees may prompt the need for longer flights and increased energetic demands by NLEB at a time when they may already be energetically challenged. NLEB emerge from hibernation with their lowest annual fat reserves and soon thereafter must return to their summer home ranges. The spring staging period precedes migration to summer habitats. During this period, NLEB remain near

hibernacula. They feed and reenter hibernacula daily, where they enter torpor to minimize energy loss during the day. Individuals may increase fat reserves during this period, but are unlikely to regain the large amounts of fat lost during hibernation.

For several reasons, winter tree harvest that substantially alters summer roosting habitat for NLEB could result in adverse effects to affected individuals. NLEBs have summer home range fidelity (Foster and Kurta 1999; Patriquin et al. 2010; Broders et al. 2013). Activities that take place during the winter that render summer habitats unsuitable may force NLEB to rely on low energy reserves to find new roosts or foraging areas. This may put additional stress on females that are often pregnant. Hibernation and reproduction are the most energetically demanding periods for temperate-zone bats, including the NLEB (Broders et al. 2013). Bats may reduce metabolic costs of foraging by concentrating efforts in areas of known high prey profitability, a benefit that could result from the bat's local roosting and home range knowledge and site fidelity (Broders et al. 2013). Cool spring temperatures provide an additional energetic demand, as bats need to stay sufficiently warm or enter torpor (state of mental or physical inactivity). Entering torpor comes at a cost of delayed parturition, which may affect the fitness of yearling NLEB. Bats born earlier in the year have a greater chance of surviving their first winter and breeding in their first year of life (Frick et al. 2009). Delayed parturition may also be costly because young of the year and adult females would have less time to prepare for hibernation (Broders et al. 2013). Female NLEB typically roost colonially, with their largest population counts occurring in the spring or early summer, presumably as one way to reduce thermal costs for individual bats (Foster and Kurta 1999). Therefore, similar to other temperate bats, NLEB have multiple high metabolic demands (particularly in spring) and must have sufficient suitable roosting and foraging habitat available in relatively close proximity to allow for successful reproduction.

In summary, tree clearing and removal associated with access road construction could have both adverse and beneficial effects on habitat suitability for the NLEB. The 41 acres of habitat that will be affected by these activities are scattered throughout the action area and will occur over an approximate 5-year period. There will be large amounts of unaffected, intact forested habitat adjacent to or near the access roads throughout this period. In addition, the potential for direct effects from tree removal will be minimized by temporal restrictions (winter activity only). Winter tree removal may still result in adverse effects when tree densities are reduced to a level that decreases their suitability as summer habitat, but winter tree removal has the advantage of avoiding direct mortality to roosting bats. While many of these temporary access roads may be re-opened in the future (and the remaining access roads will be long-term or permanent), we conclude that the overall habitat suitability or availability for NLEB foraging and roosting within the action area should be minimally affected by proposed tree clearing and removal activities.

Effects from Noise, Disturbance

Noise and vibration and general human disturbance are stressors that may disrupt normal feeding, sheltering, and breeding activities of the NLEB. Many activities may result in increased noise/vibration/disturbance that may result in effects to bats. Bats may be exposed to

noise/vibration/disturbance from various USFS activities near their roosting, foraging, or swarming areas.

Significant changes in noise levels in an area may result in temporary to permanent alteration of bat behaviors. The novelty of these noises and their relative volume levels will likely dictate the range of responses from individuals or colonies of bats. At low noise levels (or farther distances), bats initially may be startled, but they would likely habituate to the low background noise levels. At closer range and louder noise levels (particularly if accompanied by physical vibrations from heavy machinery and the crashing of falling trees) many bats would probably be startled to the point of fleeing from their day-time roosts. For projects with noise levels greater than those usually experienced by bats and that continue for multiple days, the bats roosting within or close to these areas are likely to shift their focal roosting areas further away or may temporarily abandon these roosting areas completely.

There is limited literature available regarding impacts from noise (outside of road/traffic) on bats. Gardner et al. (1991) had evidence that an NLEB conspecific, Indiana bat, continued to roost and forage in an area with active timber harvest. Also see the timber harvest section above regarding other similar studies for NLEB. They suggested that noise and exhaust emissions from machinery could possibly disturb colonies of roosting bats, but such disturbances would have to be severe to cause roost abandonment. Callahan (1993) noted that the likely cause of the bats in his study area abandoning a primary roost tree was disturbance from a bulldozer clearing brush adjacent to the tree. However, his last exit count at this roost was conducted 18 days prior to the exit count of zero. Indiana bats have also been documented roosting within approximately 300 meters of a busy state route adjacent to Fort Drum Military Installation (Fort Drum) and immediately adjacent to housing areas and construction activities on Fort Drum (US Army 2014). Bats roosting or foraging in all of the examples above have likely become habituated to the noise/vibration/disturbance. Novel noises would be expected to result in some changes to bat behaviors.

In summary, NLEB currently present in the forest are expected to be tolerant to a certain degree of existing (prior to initiation of proposed activities) noise, vibration, and disturbance levels. However, temporary and novel noise/vibration/disturbance associated with heavy equipment operation and tree cutting may result in responses by bats that are roosting or foraging in these areas. We expect that affected bats are likely to shift their focal roosting areas further away or may temporarily abandon these roosting areas completely.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Any actions conducted on Superior National Forest lands will either be conducted by the USFS, or will require approval by the USFS and thus will require separate section 7 consultation. Therefore, cumulative effects, as defined in the ESA, are not expected to occur on their Forest lands.

The BA indicated that 19 special use permits for access roads will be associated with up to 1,746 ac of timber harvest on state and county lands, in units ranging from 12 to 176 ac. At least 511 ac of 1,746 ac will be winter harvest only; however, suitable summer habitat will still be impacted indirectly. Harvest on the remaining 1,235 ac may occur during the summer roosting period resulting in direct effects to NLEB and their habitat. Harvest on state and county lands may alter available NLEB summer roosting habitat and also result in death, harm, and harassment of individual NLEBs. Based on the same rationale discussed above on federal lands and because NLEB habitat is abundant and well distributed within the action area, we anticipate that state and county harvest activities will result in minimal cumulative effects to the status of the species and its habitat in the action area.

Summary of Effects

Impacts to Individuals

Potential effects of the action include indirect effects as a result of changes in habitat suitability and direct effects to NLEB present within the action area when activities are being conducted. Tree removal for access roads on Forest lands and state/county timber harvest activities may indirectly affect NLEB habitat suitability. Direct effects to NLEB include mortality, injury, harm, or harassment as a result of removal of roost trees, noise, and general human presence.

Some of the actions proposed are likely to cause direct adverse effects to individual NLEBs. The potential for direct effects from timber harvest and other tree clearing activities and associated noise and disturbance is greatest during spring and summer (mid-April through July) when bats return from hibernation, spring temperatures result in periodic use of torpor, and non-volant young may be present. In addition, bats impacted by WNS have additional energetic demands and reduced flight capability. WNS has not been detected in Minnesota; however, the fungus that causes WNS was first detected in 2011–2012. The Forest's conservation measures will reduce the potential for direct effects to the NLEB.

Indirect effects from the action may result from habitat modification and primarily involve changes to roosting and foraging suitability. Tree clearing associated with access roads and state/county timber harvests could have both adverse and beneficial effects on habitat suitability for the NLEB. Given the scope of the projects in relation to the overall action area, these special use permits for temporary and long-term/permanent access roads and associated timber harvests projects will not substantially alter the overall availability or suitability of NLEB roosting or foraging habitat in the action area.

While none of the USFS's proposed actions will alter the amount or extent of mortality or harm to NLEB resulting directly from WNS, the USFS's proposed action can be neutral, negative, or beneficial to bats. The continued implementation of the USFS's monitoring efforts will provide additional information on the effect of the USFS's actions on affected bats. Minimal cumulative effects are expected.

While analyzing the effects of the proposed action, we identified the life stages that would be exposed to the stressors associated with the proposed action, and analyzed how those individuals would respond upon exposure to the stressors. From this analysis, we determined that:

- 1) Neither hibernating bats nor their hibernacula will be exposed to the project stressors as there are currently no known hibernacula within the vicinity of the Action Area.
- 2) The NLEB during the spring-fall period will be exposed to various project stressors and their responses to some of them are likely to be adverse.

We considered the possibility for NLEB to be exposed to the effects of project activities at currently unknown roost sites. We anticipate that this will result in the harassment of NLEBs that may flush bats during daylight and cause them to temporarily or permanently abandon their roosts (which may have pups). In addition, mortality of pups and adults is possible from tree removal for access roads and associated timber harvest. In summary, there will be impacts to individual bats in terms of either reduced survival or reproduction.

Impacts to Populations

As we have concluded that individual bats are likely to experience reductions in either their annual or lifetime survival or reproductive rates, we need to assess the aggregated consequences of these effects to exposed individuals as they relate to the population to which these individuals belong.

The action area will continue to provide suitable habitat conditions for NLEB foraging and roosting during the summer while the proposed tree clearing for access roads and associated state/county timber harvest activities are implemented and after they are complete. There is potential for direct take of the species. The extent of the area where direct take is likely due to the proposed action in relation to the entire action area, and the current distribution and abundance of NLEB habitat on the Superior National Forest (as described in the Environmental Baseline), the effects of the proposed activities are unlikely to reduce the likelihood that NLEB will continue to survive and reproduce on the Forest.

Impacts to the Species

Many of the proposed actions by the Forest are likely to result in benefits to the species over the long term due to the maintenance of a mosaic of forest types. While we recognize that the status of the species is uncertain due to WNS, given the environmental baseline, and the intensity, frequency, and duration of the project impacts, we find that the proposed project is unlikely to have appreciable impacts on the population that inhabits the action area. Thus, no component of the proposed action is expected to reduce the reproduction, numbers, or distribution of the NLEB rangewide. Therefore, we do not anticipate a reduction in the likelihood of both survival and recovery of the species as a whole.

CONCLUSION

After reviewing the current status of this species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the northern long-eared bat. No critical habitat has been designated to date for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR § 17.3). Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

On April 2, 2015, the Service published an interim species-specific rule pursuant to section 4(d) of the ESA for NLEB (80FR17974). The Service's interim 4(d) rule for NLEB exempts the take of NLEB from the section 9 prohibitions of the ESA, when such take occurs as follows (see the interim rule for more information):

- (1) Take that is incidental to forestry management activities, maintenance/limited expansion of existing rights-of way, prairie management, projects resulting in minimal (<1 acre) tree removal, provided these activities:
 - a. Occur more than 0.25 mile (0.4 km) from a known, occupied hibernaculum;
 - b. Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31); and,
 - c. Avoid clearcuts (and similar harvest methods, *e.g.*, seed tree, shelterwood, and coppice) within 0.25 (0.4 km) mile of known, occupied roost trees during the pup season (June 1–July 31).
- (2) Removal of hazard trees (no limitations).
- (3) Purposeful take that results from
 - a. Removal of bats from and disturbance within human structures; and,

- b. Capture, handling, and related activities for northern long-eared bats for 1 Year following publication of the interim rule.

The incidental take that is carried out in compliance with the interim 4(d) rule does not require exemption in this Incidental Take Statement because it is already exempted by the rule. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions because all incidental take has already been exempted.

The temporary road access and associated timber harvest on other land ownerships proposed by the SNF fall under the category of forest management and the permanent and long-term road access activities fall under minimal tree removal (< 1 acre), and all are covered by the interim 4(d) rule. Because all incidental take that is anticipated will occur as a result of forest management and minimal tree removal, and because the SNF will apply the conservation measures of the interim 4(d) rule, there is no incidental take that is anticipated that is not exempted by the rule.

Amount or Extent of Take

If NLEB are present or utilize an area proposed for road access tree removal, timber harvest or other disturbance, incidental take of NLEB could occur. The Service anticipates incidental take of the NLEB will be difficult to detect for the following reasons: (1) the individuals are small and occupy summer habitats where they are difficult to find; (2) the NLEB forms small, widely dispersed maternity colonies under loose bark or in the cavities of trees and males and non-reproductive females may roost individually, which makes finding the species or occupied habitats difficult; (3) finding dead or injured specimens during or following project implementation is unlikely; (4) the precise distribution and density of the species within its summer habitat in the action area is unknown; and, (5) in many cases incidental take will be non-lethal and undetectable.

Monitoring to determine actual take of individual bats within an expansive forested area is unlikely to produce useful information unless a large number of individual trees that may contain suitable roosting habitat are inspected by a knowledgeable biologist when felled. To minimize or avoid take that is caused by felling trees with roosting bats, a similar tree-by-tree inspection would have to occur before trees are felled. Inspecting individual trees is not considered by the Service to be a reasonable survey method and is not recommended as a means to determine incidental take. However, the areal extent of potential roosting and foraging habitat affected can be used as a surrogate to monitor the level of take.

The Service anticipates that no more than 41 acres of suitable summer NLEB habitat will be disturbed as a result of these ongoing project activities on the Forest (and 1,746 ac on state/county lands).

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to NLEB. No critical habitat has been designated for NLEB, so none would be impacted.

Reasonable and Prudent Measures/Terms and Conditions

Since all anticipated incidental take will result from forest management activities addressed by the 4(d) rule and because the Forest will apply the conservation measures described above and in the rule, the take is already exempted; therefore, no reasonable and prudent measures or terms and conditions will be required.

Reporting Requirements

1. The USFS shall provide the Service with a report summarizing the activities completed as part of the proposed actions and the extent of the area affected by each. This report shall be provided to the Service no later than January 31 each year until all activities are complete.

2. The USFS shall make all reasonable efforts to educate personnel to report any sick, injured, and/or dead bats (regardless of species) located on the Superior National Forest immediately to the Forest Biologist. The USFS point of contact will subsequently report to the Service's Twin Cities Field Office (TCFO) (612-725-3548) and/or the Minnesota Department of Natural Resources (MNDNR; see <http://www.dnr.state.mn.us/wns/index.html> or call 1-888-345-1730). No one, with the exception of trained staff or researchers contracted to conduct bat monitoring activities, should attempt to handle any live bat, regardless of its condition. If an injured bat is found, if possible, effort should be made by trained staff (with rabies vaccination) to transfer the animal to a wildlife rehabilitator. If needed, TCFO and/or MNDNR will assist in species determination for any dead or moribund bats. Any dead bats believed to be NLEB will be transported on ice to the TCFO or MNDNR. If an NLEB is identified, TCFO will contact the appropriate Service law enforcement office. Care must be taken in handling dead specimens to preserve biological material in the best possible state. In conjunction with the care of sick and injured fish or wildlife and the preservation of biological materials from dead specimens, the USFS has the responsibility to ensure that information relative to the date, time, and location of NLEB, when found, and possible cause of injury or death of each is recorded and provided to the Service. In the extremely rare event that someone has been bitten by a bat, please keep the bat in a container and contact the local health department.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help carry out recovery plans, or to develop information.

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The Service has identified the following actions that, if undertaken by the USFS, would further the conservation of the northern long-eared bat. We recognize that limited resources and other agency priorities may affect the ability of the USFS to conduct these activities at any given time.

1. Assist with WNS investigations, where feasible. For example:
 - a. Monitor the status/health of known colonies;
 - b. Collect samples for ongoing or future studies; and,
 - c. Allow USFS staff to contribute to administrative studies related to WNS (on or off of USFS lands, as appropriate).
2. Monitor pre- and post-WNS distribution of the northern long-eared bat on the Superior National Forest.
 - a. Search for hibernacula within the National Forest;
 - b. Conduct inventory surveys;
 - c. Conduct radio telemetry to monitor status of northern long-eared bat colonies; and,
 - d. Participate in North American Bat Monitoring Program (NABat; a national effort to monitor and track bats) through submission of survey data.
3. Encourage research and administrative studies on the summer habitat requirements of the northern long-eared bat on the Superior National Forest that:
 - a. Investigate habitat characteristics of the forest in areas where pre- and post-WNS northern long-eared bat occurrences have been documented (acoustically or in the hand) (e.g. forest type, cover, distance to water).
 - b. Investigate the northern long-eared bat use (acoustics, radio telemetry) of recently managed areas of different prescriptions.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the conservation recommendations carried out.

REINITIATION NOTICE

This concludes formal consultation for the USFS's actions outlined in your request dated March 23, 2015. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in

a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease pending reinitiation.

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